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November 11, 2004

George N. Dorn, Jr.
Interim Executive Director
Public Service Commission of South Carolina
PO Drawer 11649
Columbia, SC 29210

Re: Application of SCE&G for Approval of an Increase in its Electric Rate
and Charges
Docket No. 2004-178-E

Dear Mr. Dorn:

Please find a copy of an article entitled "EL&P Exclusive: 2002 Operating Performance Rankings Reflect Changes in Market Dynamics" from the November 2003 issue of Electric Light & Power magazine as late filed exhibit # 8. By copy of this letter to all parties of record, I am sending them a copy of the article as well.

Sincerely,


Catherine D. Taylor

CDT/kms
Enclosure

cc: F. David Butler, Esq.
Elliott Elam, Esq.
Audrey Van Dyke, Esq.
Scott Elliott, Esq.
Frank Ellerbe, Esq.
Frank Knapp, Jr.
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Angela S. Beehler, Esq.

EL&P exclusive: 2002 operating performance rankings reflect changes in market dynamics

EL&P again collaborated with Energy Ventures Analysis (EVA), Arlington, Va., for this report. Tom Hewson, EVA principal, discussed the following generation sector snapshots in a recent interview.

Nuclear plants' capacity factors up slightly

Table 1 shows the rankings of nuclear plants by generation. Of the top 20 plants, 19 are the same as last year. Most

changes in relative position on the list are attributable to differences in scheduling of planned outages. While no new nuclear plants are currently being built, considerable investment has been made to expand existing nuclear capacity and power output. Generation increased by 1.6 percent and capacity by 0.9 percent in 2002, allowing nuclear capacity factors to reach an industry record-setting average of 91.5 percent (see Table 2). These record-setting industry capacity factors have resulted from increased unit availability in part attributable to scheduling planned outages further apart.

According to Hewson, this trend of increasing nuclear generation should continue as generators are investing capital to improve output and availability of units, and nuclear power remains incrementally inexpensive. There are now five pending applications at the Nuclear Regulatory Commission (NRC) for upgrading units (expanding existing capacity), and another 28 plants have expressed similar interest and are expected to file with NRC. NRC approved eight of such applications in the first 10 months of 2003. (Last year, NRC approved 18; in 2001, 22 were approved). In addition to these upgrades, four utilities plan to restart or build new nuclear units. Three utilities have submitted applications to NRC for early site permits, which are required to build new capacity—

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Table 1. Top 20 nuclear plants (ranked by generation)

Rank	State	Utility	Power Plant	Demonstrated capacity MW	2002 Net generation 1000 MWh	Capacity factor %
1	AZ	Pinnacle West	Palo Verde	3,744	30,862	94.1%
2	SC	Duke Power	Oconee	2,538	20,685	93.0%
3	IL	Exelon	Braidwood	2,530	20,165	91.0%
4	SC	Duke Power	Catawba	2,258	19,654	99.4%
5	IL	Exelon	Byron	2,590	19,365	85.4%
6	PA	Exelon	Limerick	2,300	19,296	95.8%
7	TX	Reliant Energy	South Texas	2,636	19,050	85.7%
8	PA	Exelon	Peach Bottom	2,212	18,617	96.1%
9	TN	Tennessee Valley Authority	Sequoyah	2,264	18,496	93.3%
10	AL	Tennessee Valley Authority	Browns Ferry	2,236	18,171	92.8%
11	CA	Southern Calif Edison Co	San Onofre	2,150	18,048	95.8%
12	NC	Duke Power	McGuire	2,200	18,014	93.5%
13	IL	Exelon	LaSalle City	2,187	17,923	93.6%
14	PA	PPL Corporation	Susquehanna	2,201	17,384	90.2%
15	GA	Southern Company	Vogtle	2,297	17,057	84.8%
16	NJ	PSEG Power LLC	Salem	2,244	16,996	86.5%
17	TX	Texas Utilities	Comanche Peak	2,300	16,568	82.2%
18	CA	Pacific Gas & Electric Co	Diablo Canyon	2,181	16,294	85.3%
19	MI	AEP-Indiana Michigan Electric	Donald C Cook	2,125	15,429	82.9%
20	CT	Dominion Resources	Milstone	2,020	14,918	84.3%

Table 2. Top 20 nuclear plants ranked by capacity factor

Rank	State	Holding company/utility name	Power plant	Demonstrated capacity MW	2002 Net generation 1000 MWh	Capacity factor %
1	PA	Exelon	Three Mile Island Unit 1	798	7,314	104.6%
2	NC	Progress Energy-Carolina Power & Light	Harris	900	7,835	99.4%
3	SC	Duke Power	Catawba	2,258	19,654	99.4%
4	FL	Progress Energy-Florida Power Corp	Crystal River	843	7,300	98.9%
5	MA	Entergy	Pilgrim	667	5,769	98.7%
6	FL	Florida Power & Light Co	Turkey Point	1,410	12,073	97.7%
7	VA	Dominion Resources	Surry	1,602	13,672	97.4%
8	MN	Xcel-Northern States Power	Monticello	589	5,016	97.3%
9	NJ	PSEG Power LLC	Hope Creek	1,052	8,928	96.9%
10	FL	Florida Power & Light Co	St Lucie	1,692	14,330	96.7%
11	PA	Exelon	Peach Bottom	2,212	18,617	96.1%
12	CA	Southern Calif Edison Co	San Onofre	2,150	18,048	95.8%
13	PA	Exelon	Limerick	2,300	19,296	95.8%
14	MI	Detroit Edison	Fermi	1,112	9,301	95.5%
15	MS	Entergy	Grand Gulf	1,204	10,059	95.4%
16	WI	WPS Resources	Kewaunee	539	4,469	94.6%
17	NC	Progress Energy-Carolina Power & Light	Brunswick	1,663	13,777	94.6%
18	AR	Entergy	Arkansas Nuclear One	1,758	14,559	94.5%
19	AZ	Pinnacle West	Palo Verde	3,744	30,862	94.1%
20	NE	Nebraska Public Power District	Cooper Stn	767	6,317	94.0%

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Table 1. Top 20 nuclear power plants ranked by generation

Table 3. Top 20 coal-fired power plants ranked by generation

Table 5. Top 20 most energy efficient coal-fired power plants ranked by heat rate efficiency

Table 7. Combined cycle generation by plant

Table 9. Combined cycle heat rate by plant

Sources:

Energy Ventures Analysis, Arlington, Va.

U.S. Energy Information Administration

U.S. Nuclear Regulatory Commission, "Nuclear Power Plant Status Report," Washington, D.C., 10/20/02

U.S. Nuclear Regulatory Commission, "Nuclear Power Plant Status Report," Washington, D.C., 10/20/02

Table 3. Top 20 coal-fired power plants ranked by generation

Rank	State	Holding company/utility name	Plant name	2002 Net generation (MWh)	2002 Capacity (MW)	Capacity factor %
1	GA	Southern Company	Bowen	21,674,482	3,217	76.9%
2	GA	Southern Company	Scherer	20,817,252	3,346	71.0%
3	IN	Cinergy	Gibson	20,522,153	3,144	74.5%
4	AL	Southern Company	Miller	18,592,131	2,779	76.4%
5	TX	CenterPoint Energy-Houston L&P	W A Parish	18,363,601	2,592	80.9%
6	WV	AEP-Appalachian Power	John E Amos	17,995,089	2,900	70.8%
7	AZ	Salt River Project	Navajo	17,832,139	2,250	90.5%
8	NC	Duke Power	Belews Creek	16,912,850	2,240	86.2%
9	MI	Detroit Edison	Monroe	16,721,026	3,000	63.6%
10	IN	AEP-Indiana Michigan Electric	Rockport	16,643,319	2,600	73.1%
11	TN	Tennessee Valley Authority	Cumberland	16,384,132	2,488	75.2%
12	PA	FirstEnergy	Bruce Mansfield	15,974,911	2,360	77.3%
13	OH	AEP-Ohio Power	Gen J M Gavin	15,617,077	2,600	68.8%
14	OH	FirstEnergy	W H Sammis	15,520,511	2,220	79.8%
15	MN	Xcel-Northern States Power	Sherburne Co	15,383,299	2,313	75.9%
16	OH	Dayton P&L	J M Stuart	15,351,286	2,340	74.9%
17	KS	Westar Energy	Jeffrey	15,330,637	2,227	78.6%
18	TX	TXU	Martin Lake	14,825,002	2,269	74.6%
19	WY	Scottish Power-PacifiCorp	Jim Bridger	14,593,034	2,110	79.0%
20	NC	Duke Power	Marshall	14,498,223	2,090	79.2%

Table 4. Top 20 highest utilized coal-fired power plants ranked by capacity factor

Rank	State	Holding company/utility name	Plant name	2002 Net generation (MWh)	2002 Capacity (MW)	Capacity factor %
1	PA	Northampton Generating Co LP	Northampton Generating Co LP	1,148,123	114	114.7%
2	WY	Black Hills P&L	Neil Simpson II	734,113	80	104.8%
3	WY	Black Hills P&L	Neil Simpson	146,249	17	99.9%
4	WY	Scottish Power-Pacificorp	Wyodak	2,858,420	335	97.4%
5	UT	Deseret Gen & Trans Coop	Bonanza	3,923,323	460	97.4%
6	NY	Black River Ltd Partnership	Fort Drum H T W Cogeneration Facility	424,569	50	97.1%
7	LA	Nelson Industrial Steam Co	Nelson Industrial Steam Co	1,848,204	200	94.1%
8	TX	Sempra Energy	Twin Oaks (TNP One)	2,472,216	301	93.8%
9	AK	Golden Valley Electric Association	Healy	204,728	25	93.5%
10	UT	Los Angeles (City Of)	Intermountain	13,485,597	1,650	93.3%
11	CO	Xcel-Public Service Colorado	Hayden	3,631,182	446	92.9%
12	NY	AES Corporation	Somerset (Kintigh)	5,453,551	675	92.3%
13	WY	General Chemical Corp	General Chemical	242,276	30	92.2%
14	CO	Colorado Springs (City Of)	Ray Nixon	1,567,595	208	91.5%
15	IL	Ameren	Joppa Steam	8,075,552	1,014	90.9%
16	ND	Great River Energy	Coal Creek	8,559,089	1,079	90.6%
17	AZ	Salt River Project	Navajo	17,832,138	2,250	90.5%
18	WY	Black Hills P&L	Osage	240,138	30	90.0%
19	SC	SCANA Corporation	Cope	3,243,770	413	89.8%
20	FL	TECO Energy	Polk	1,955,959	250	89.3%

Table 5. Top 20 most energy efficient coal-fired power plants ranked by heat rate efficiency

Rank	State	Holding company/utility name	Plant name	2002 Net generation (MWh)	2002 Fuel consumption (MMBtu)	2002 Capacity (MW)	Capacity factor %	Heat rate (Btu/kWh)
1	TN	Tennessee Valley Authority	Bull Run	6,760,080	61,081,802	869	88.8%	9,038
2	MD	Mirant Corp	Morgantown	7,516,276	67,998,417	1,165	73.6%	9,047
3	NC	Duke Power	Marshall	14,498,223	131,366,097	2,090	79.2%	9,061
4	NC	Duke Power	Belews Creek	16,912,850	153,948,618	2,240	86.2%	9,102
5	PA	Edison Mission Energy	Homer City	12,177,116	113,893,766	1,884	73.8%	9,353
6	PA	Reliant Energy	Connaugh	12,583,864	117,696,782	1,700	84.5%	9,353
7	GA	Southern Company	Wansley	11,194,817	104,740,874	1,741	73.4%	9,356
8	UT	Los Angeles (City Of)	Intermountain	13,485,597	126,467,560	1,650	93.3%	9,378
9	FL	TECO Energy	Polk	1,955,959	18,407,218	250	89.3%	9,411
10	SC	SCANA Corporation	Cope	3,243,770	30,539,726	413	89.8%	9,415
11	TX	San Antonio Public Service Board	J K Spruce	4,135,806	38,946,912	555	85.1%	9,417
12	AL	Southern Company	E C Gaston	12,637,310	119,347,547	1,893	76.2%	9,444
13	NY	AES Corporation	Somerset (Kintigh)	5,453,551	51,650,866	675	92.3%	9,471
14	WV	AEP-Appalachian Power	Mountaineer	8,985,024	85,218,638	1,300	78.9%	9,485
15	PA	Reliant Energy	Keystone	11,788,718	111,823,175	1,700	79.2%	9,486
16	SC	Santee Cooper	Cross	8,126,251	77,480,457	1,160	80.0%	9,535
17	GA	Southern Company	Bowen	21,674,482	207,815,283	3,217	76.9%	9,588
18	SC	SCANA Corporation	Williams	4,426,194	42,500,489	603	83.9%	9,602
19	NC	Powergen-LG&E Energy	Roanoke Valley I	1,359,835	13,070,048	182	85.1%	9,611
20	KY	AEP-Kentucky Power	Big Sandy	5,752,379	55,413,648	1,080	61.9%	9,633

Table 6. Top 20 cleanest coal-fired plants based upon SO₂ emission rates

Rank	State	Holding company/utility name	Plant name	SO ₂ Rate (lbs/MMBtu)	2002 SO ₂ (tons)	2002 Heat input (mmBtu)
1	AZ	Salt River Project	Navajo	0.040	4,007	199,398,686
2	UT	Deseret Generation & Transmission Coop	Bonanza	0.044	981	44,445,145
3	UT	Los Angeles (City Of)	Intermountain	0.060	3,648	146,039,577
4	VA	Dominion Resources	Clover	0.064	2,111	66,061,187
5	CO	Platte River Power Authority	Rawhide	0.074	898	24,284,890
6	NV	Nevada Power	Gardner	0.076	1,977	52,290,147
7	PA	Reliant Energy	Connaugh	0.105	5,936	113,132,106
8	SC	SCANA Corporation	Cope	0.110	1,879	34,270,959
9	KS	Sunflower Electric Cooperative	Holcomb	0.125	1,869	26,626,279
10	WV	Allegheny Power System	Harrison	0.127	8,691	136,430,137
11	CO	Xcel-Public Service Colorado	Hayden	0.133	2,868	43,214,614
12	MI	Marquette (City Of)	Shiras	0.134	237	3,551,115
13	NM	Plains Electric Generation Transmission Coop	Escalante	0.139	1,192	17,152,014
14	UT	Scottish Power-Pacificorp	Hunter	0.143	7,026	98,263,885
15	PA	Foster Wheeler	Foster Wheeler Mt Carmel Incorporated	0.154	362	4,689,993
16	WY	Black Hills P&L	Neil Simpson II	0.155	705	9,094,729
17	NY	AES Corporation	Somerset (Kintigh)	0.158	4,149	52,470,935
18	WY	Basin Electric Power Coop	Laramie River	0.162	11,134	137,136,046
19	TX	AEP-West Texas Utilities	Oldunion	0.163	3,738	45,923,129
20	MO	Great Plains Energy	Hawthorn	0.167	3,751	44,973,249

Operating performance...

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Dominion Nuclear's North Anna, System Energy Resources' Grand Gulf, and Exelon Generating's Clinton. TVA plans to restart Browns Ferry in 2008.

These plans could be just "the tip of the iceberg" if stringent carbon dioxide (CO₂) limits, are eventually adopted. New York Gov. George E. Pataki has asked the governors of 10 Northeastern states to join a regional initiative to reduce CO₂ emissions from power plants. According to a recent EVA report, this initiative would trigger the need for the Northeast to add 11,800 MW of new nuclear capacity over the next 10 years and build an additional two nuclear plants every year thereafter (to maintain the CO₂ limits).

The only dark cloud over nuclear's brighter future is the final resolution to the spent nuclear waste disposal issue and the emergence of corrosion and cracking problems, most likely related to coolant leaks, that have been

identified in three pressurized water reactors—FirstEnergy's Davis Besse, CenterPoint's South Texas and Entergy's Waterford Unit 3.

Coal plants see benefits from high natural gas prices

Many new plants were announced a few years ago, but few are actually being built. Saber-rattling and discussions continue, but only six new coal plants are now under active development (meaning approvals have been completed and financing is in place).

Coal generation showed an increase between 2001 and 2002, but capacity continues to drop off somewhat as some smaller units are retired (units where investment for pollution controls will not be made).

The top four units in Table 3 are the same, although rankings have changed somewhat. Last year, to be in the top 10, a plant needed to have generation above 15.8 million MWh. This year, the cutoff is 16.6 million MWh, which reflects the increase in utilization of coal units due to the increase in natural gas costs.

Six new plants are included in the list this year (Nos. 6, 8, 12, 14, 16, 20), all of which are located in the East. These plants benefited primarily from high natural gas prices and the Davis Bessie nuclear plant problems. Of the six plants that were dropped, three were in the West (most likely a result of the comeback of hydro supply in the Northwest).

Hewson believes that a significant factor in future performance of coal plants will be the system effects from the expansion of the EPA seasonal NO_x program and the addition of environmental controls for emissions, such as ozone (nitrogen oxides, NO_x). Beginning next year, coal units in most eastern states will incur additional NO_x penalties during the 5-month ozone season. Not only will the production costs increase but the required NO_x controls could adversely affect the availability of units and lower net output from higher parasitic loads. Some Eastern units may have difficulty maintaining their generation output as environmental controls are added to meet tighter limitations.

Overall, coal generation in 2002 was at 70.6 percent capacity factor vs. 69.9 percent in 2001.

There was a slight increase in net capacity factor in part due to retirement of smaller units. Most listed plants in Table 4 are either Western units selling power into the high cost California or Denver markets or were cogeneration plants ("qualifying facilities"), which have nondispatchable contracts. Several high capacity factor plants are minemouth plants with low fuel costs.

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Table 7. Combined cycle generation by plant (MWh)

Rank	State	Holding company/utility name	Power plant	MW	2002 Net generation (MWh)	Capacity factor
1	MI	Midland Cogen Venture	Midland Cogen Venture	1,868	8,323,362	50.9%
2	FL	FPL Group	Martin	975	6,926,308	81.1%
3	FL	FPL Group	Fort Myers	1,242	6,497,004	59.7%
4	FL	FPL Group	Lauderdale	905	6,241,468	78.7%
5	CA	Calpine	Sutter Power Plant	638	6,213,636	111.3%
6	AL	Southern Company	Barry	1,070	6,119,064	65.3%
7	TX	Dow Chemical Company	The Dow Chemical Co Texas Oper	1,500	5,708,933	43.4%
8	TX	American National Power	Midlothian Energy Project	1,560	5,697,112	41.7%
9	TX	FPL Group	Lamar	1,000	5,685,767	64.9%
10	MS	Southern Company	Victor J Daniel Jr	1,070	5,166,334	55.1%
11	CO	Xcel-Public Service of Colorado	Pt St Vrain	486	4,663,215	109.5%
12	TX	Calpine	Pasadena Powerplant	785	4,555,258	66.2%
13	TX	Tenaska	Tenaska Gateway Generating Station	845	4,426,124	58.8%
14	NJ	Goldman Sachs	Linden Cogen	762	4,325,144	64.8%
15	TX	Texas Independent Energy	Odessa-Ector Generating Station	1,000	4,306,936	49.2%
16	TX	Tenaska Frontier Partners Ltd	Tenaska Frontier Generating Station	830	4,139,042	56.9%
17	ME	Calpine Construction Fin Co LP	Westbrook Energy Center	510	3,976,565	89.0%
18	CT	PG&E-National Energy Group	Lake Road Generating	792	3,831,019	55.2%
19	TX	Panda/PSEG Global	Guadalupe Power Partner	1,000	3,804,525	43.4%
20	NY	Exelon	Sithr/Independence Station	1,039	3,785,044	41.6%

Table 8. Combined cycle capacity factor ranked by percent

Rank	State	Holding company/utility name	Power plant	MW	Capacity factor %
1	TX	Exxon Mobil Oil Corp	Beaumont Refinery	205	117.3%
2	CO	Thermo Power & Electric Inc	Thermo Power & Electric Inc	73	113.2%
3	CA	Calpine	Sutter Power Plant	638	111.3%
4	AZ	CalEnergy Company Inc	Yuma Cogen Associates	50	110.7%
5	CO	Xcel-Public Service of Colorado	Pt St Vrain	486	109.5%
6	CA	Kern River Cogeneration Co	Sycamore Cogen Co	300	99.6%
7	NY	Indeck Corinth Ltd Partnership	Indeck-Corinth Energy Center	125	97.3%
8	CA	Kern River Cogeneration Co	Kern River Cogen Co	300	97.2%
9	CA	Sacramento Mun Util Dist	Campbell Soup	143	96.2%
10	CA	Midway-Sunset Cogeneration Co	Midway Sunset Cogen Co	234	95.7%
11	CA	Calpine	King City Power Plant	120	95.6%
12	NY	Saranac Power Partners LP	Saranac Facility	240	95.4%
13	CA	Delta Power Company, LLC	Carson Cogeneration Company	43	95.3%
14	NV	Mission Oper & Maint Inc	Saguaro Power Co	90	95.3%
15	NY	Power Authy Of St Of N Y	Richard M Flynn	150	95.1%
16	CA	Goal Line LP	Goal Line LP	51	94.9%
17	NY	Trigen Nassau Energy Corp	Trigen-Nassau Energy Corp	56	94.9%
18	OR	Wiltonette Industries Inc	Albany Paper Mill	51	94.1%
19	TX	CenterPoint Energy-Houston L&P	San Jacinto SES	162	93.5%
20	TX	Quxx Corp	Black Hawk Station	200	93.0%

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Table 5 ranks efficiency of coal-fired plants by heat rates. The goal of coal generators is to improve their plants' energy efficiencies and lower production costs to improve dispatch.

The heat rate cutoff point for inclusion on this list is about the same as last year. Coal technologies are a significant factor—supercritical boilers clearly have the advantage when it comes to being included on this list.

Also, the absence of post-combustion environmental controls also benefits energy efficiency because of lower parasitic loads.

Plants new to the list this year include: 9 (Tampa Electric's Polk), 11 (San Antonio Public Service Board's JK Spruce), 12 (Southern Co.'s EC Gaston), 14 (AEP's Mountaineer), 16 (South Carolina Public Service Authority's Cross), 18 (SCANA Corp.'s Williams) and 19 (LG&E's Roanoke Valley I).

Polk is an integrated gasification combined cycle (IGCC) power plant that is part of DOE's Clean Coal Technology demonstration program. At a heat rate of 9,411 Btu per kWh, the station has not yet reached the technology heat rate goal of 8,200 Btu per kWh. IGCC has the promise of becoming the most energy efficient coal technology.

IGCC converts coal into a combustible gas that can be used in a turbine and the hot exhaust gases used to generate steam to drive a steam turbine. Hewson said, "If it was able to achieve the technology efficiency goal, it would be No. 1. It went from No. 21 last year to No. 9 this year."

The two prime factors determining this list in the future will be whether a plant uses supercritical technology and if it has post combustion environmental controls.

As such controls are added to the plants now on the list, rankings may be shuffled, and the list may once again include other coal plants that already have existing environmental controls in place.

Table 6 ranks coal-fired plants by their 2002 SO₂ emission rates. Six plants are new additions to the list: 12 (City of Marquette, Mich., Shiras), 15 (Foster Wheeler's Mt. Carmel), 17 (AES Corp.'s Somerset Kintigh), 18 (Basic Electric Power Coop's Laramie River), 19 (AEP's Oklaunion) and 20 (Kansas City Power & Light's Hawthorn). The highest ranking plant to drop from last year's list was the Polk plant. It dropped from No. 10 to No. 21.

These SO₂ rankings are dependent upon two factors: how well a plant's scrubber works and the quality of the [continued on page 14]

Table 9. Combined cycle heat rate by plant (Btu/kWh)

Rank	State	Holding company/utility name	Power plant	MW	Heat rate (Btu/kWh)
1	ME	Duke Energy	Maine Independence	551	6,758
2	NY	Exelon	Sithr/Independence Station	1,039	6,934
3	TX	Mirant	Bosque County	243	6,934
4	RI	FPL Energy	RI Hope Energy	537	6,944
5	AL	Calpine	Decatur Energy Center	694	6,956
6	PA	AES	AES ironwood	705	6,969
7	TX	Texas Independent Energy	Odessa-Ector Generating Station	1,000	6,984
8	NY	WPS Resources	Syracuse Generating Station	87	7,027
9	MS	Southern Company	Victor J Daniel Jr	1,070	7,033
10	CA	Foster Wheeler Power Systems	Foster Wheeler Martinez Inc	99	7,039
11	FL	Lakeland (City Of)	C D McIntosh Jr	350	7,050
12	CA	Calpine	Los Medanos Energy Facility	532	7,112
13	CT	PG&E-National Energy Group	Lake Road Generating	792	7,113
14	AZ	Calpine	South Point Energy Center	560	7,115
15	AZ	Reliant Energy	Desert Basin	598	7,116
16	RI	Tiverton Power Associate LP	Tiverton Power Associate LP	252	7,117
17	AL	Southern Company	Barry	1,070	7,124
18	TX	Tenaska Frontier Partners Ltd	Tenaska Frontier Generating Station	830	7,126
19	GA	Southern Company	Wansley	1,134	7,137
20	MI	Mirant	Zeeland Generating Station	540	7,150

Table 10. Combined cycle NO_x rate by plant (lb/MMBtu)

Rank	State	Holding company/utility name	Power plant	MW	NO _x Rate (lb/MMBtu)	2002 NO _x (tons)	2002 Heat input (mmBtu)
1	FL	Kissimmee (City Of)	Cane Island	364	0.0018	14.1	15,575,593
2	RI	Tiverton Power Associate LP	Tiverton Power Associate LP	252	0.0059	35.8	12,229,671
3	MS	Southern Company	Victor J Daniel Jr	1,070	0.0065	115.8	35,424,269
4	CT	PG&E-National Energy Group	Lake Road Generating	792	0.0071	90.1	25,433,922
5	AL	Southern Company	Theodore County	229	0.0076	43.4	11,404,839
6	CA	Duke Energy	Moss Landing	1,060	0.0078	74.7	19,124,228
7	ME	Calpine Construction Fin Co LP	Westbrook Energy Center	510	0.0080	106.1	26,602,475
8	CA	Calpine	Sutter Power Plant	638	0.0083	105.8	25,431,807
9	AL	Southern Company	Barry	1,070	0.0089	199.3	44,869,158
10	NY	Brooklyn Navy Yard Cogen LP	Brooklyn Navy Yard Cogen Partners	281	0.0089	82.8	18,639,050
11	CA	Calpine	Calpine Pittsburg	74	0.0092	114.7	24,937,930
12	AZ	Calpine	South Point	560	0.0093	96.6	20,730,793
13	CA	Sacramento Mun Util Dist	Campbell Soup	143	0.0097	48.0	9,899,448
14	MA	Berkshire Power Company LLC	Berkshire Power	270	0.0099	49.1	9,898,991
15	AL	Calpine	Hog Bayou Energy Center	245	0.0104	20.8	4,002,968
16	ME	Duke Energy	Maine Independence	551	0.0105	139.3	26,620,124
17	TX	Reliant Energy	Chanekview LP	820	0.0105	209.1	39,896,651
18	AZ	Reliant Energy	Reliant Energy Desert Basin LP	598	0.0106	139.2	26,332,245
19	MA	Rumford Power Associates LP	Rumford Power	252	0.0106	70.0	13,173,778
20	OH	Duke Energy	Washington Energy	620	0.0110	16.8	3,047,791

Operating performance...

(continued from page 13)

coal being used. The lower the sulfur content of the coal, the more likely it is that a plant will be included on this list.

The top three units are located in the West, where there is an abundant supply of low-sulfur coal. Dominion is the cleanest emitting coal unit in the East.

Factors that improve rankings include plant location in the West, being a newer plant, or if a plant is willing and able to spend more than \$200 per kW on a scrubber. A plant must also be willing to incur the additional operational cost to achieve the higher removals.

Combined cycles kick it up a notch

Table 7 shows the rankings of combined cycle generation by plant. Eight of this year's group are carryovers from last year. Last year, a plant needed to generate nearly 1.8 million MWh to be included on this list. This year, the cutoff is at nearly 3.8 million MWh. To illustrate the

difference, consider that this year's No. 20 would have ranked No. 7 last year.

Many of last year's plants have dropped off the list because big capacity generators have come on board. In some cases, generators have been in operation for all of 2002 instead of for only a part of the year (which may have been the case when the rankings were determined last year).

Hewson said, "Combined cycle capacity increased by a whopping 47 percent compared to last year. Generation increased by 33 percent. As a result, the overall combined cycle capacity factor, which was 43.3 percent last year dropped to 39.1 percent this year. There's a lot of surplus capacity out there." (See Table 8)

Table 9 lists combined cycle heat rates (Btu per kWh) by plant. This year's top reported heat rate was Duke Energy's Maine Independence (551 MW) at 6,758 Btu per kWh.

Hewson noted that theoretically achievable heat rate efficiencies are based on ideal operating conditions, including operation at full load with standard temperature and pressure. However, real-world conditions such as operating at higher ambient temperature, higher elevations, or high natural gas prices and/or surplus capacity, result in less than optimal operating conditions and much lower capacity factors.

"In many planning studies, we have seen mistakes made as a result of over-estimating unit efficiency. Heat rate efficiencies as low as 6,500 to 7,000 Btu per kWh have been assumed in several studies. Investment decisions have been made with overly optimistic assumptions that have led to over-estimating profitability and worth of plant."

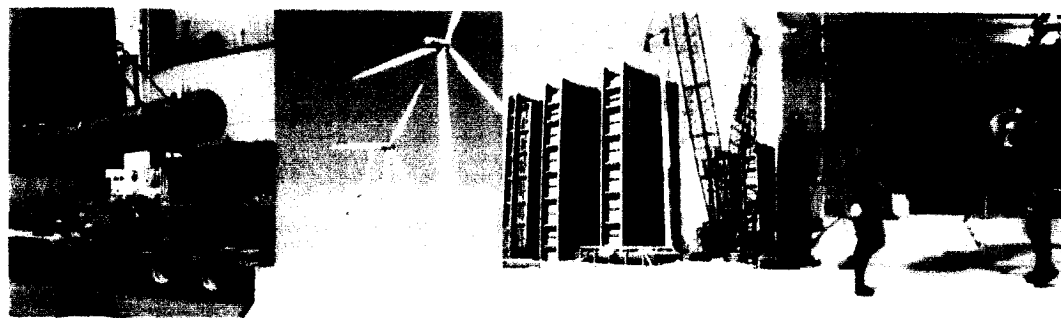
A significant factor for the combined cycle heat rate rankings in 2002 was technology and capacity factor.

He added, "Last year to be in the top 20, a plant needed a heat rate of better than 7,800 Btu per kWh. This year, the cutoff is 7,150, so there's no doubt that the new technologies are more efficient. This year's No. 20 would have been No. 6 last year. We're getting a lot of new people on the block using the more energy efficient equipment, and that's why the list is so very different than the year before."

Table 10 lists combined cycle NO_x rates (lb per MMBtu) by plant. "Last year, to be in the top 20, a plant's NO_x rate had to be less than 0.03. That just doesn't cut it this year where the cutoff is 0.0110. The bottom line is that combined cycle plants are becoming more efficient and cleaner," said Hewson. **ELP**

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